

Work Order ID 86678

86678

Page 1

July-06-12 11:22:59 AM

Item ID: D212-664-107TRN

Accept

N900040100

Setup Start *NS1*

Revision ID:

Stop *NS2*

Item Name: Crosstube Turning Detail

Start Date: 7/06/12 Start Qty: 1.00

1

Cust Item ID:

Required Date: 7/06/12 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: *P*Date: *0-07-6*

Tooling:

Date:

Run Start *NR1*

QC:

Date:

SPC (Y/N):

Date:

Stop *NR2*

| Sequence ID/ Work Center ID | Operation Description | Set Up/ Run Hours | Tool ID | Tool # | Plan Code | Accept Qty | Reject Qty | Reject Number | Insp. Stamp |
|--------------------------------|--------------------------|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|
| Draw Nbr | Revision Nbr | | | | | | | | |
| D212-664-147 | Rev B(DE0) | | | | | | | | |

100

0.00

100

MORI SEIKI CNC LATHE LARGE

Mori Seiki

Memo

0.00

Mori Seiki CNC Lathe Large

1-Fill tube with sand & install plugs DT8534 on both ends as per Folio FA705

2-Turn first side as per Folio FA113

3-Blend transition lines only, **do not sand whole tube**:

FOLIO REV: *13*DWG REV: *13*

*Use mill bastard file, brush file repeatedly with file card.

*Do not use sandpaper coarser than 320 grit.

1 *φ*
mm.l
12/11/07

110

QC1- Inspect dimensions to dimension sheet

0.00

110

QC

Memo

0.00

Quality Control

1 *φ*
mm.l
12/11/07

Work Order ID 86678***86678***

Page 2

July-06-12 11:22:59 AM

Item ID: D212-664-107TRN

Accept

N900040100Setup Start ***NS1***

Revision ID:

Stop ***NS2***

Item Name: Crosstube Turning Detail

Start Date: 7/06/12 Start Qty: 1.00 ***1***

Cust Item ID:

Required Date: 7/06/12 Req'd Qty: 1.00 ***1***

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start ***NR1***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

| Sequence ID/ Work Center ID | Operation Description | Set Up/ Run Hours | Tool ID | Tool # | Plan Code | Accept Qty | Reject Qty | Reject Number | Insp. Stamp |
|--------------------------------|--------------------------|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|
|--------------------------------|--------------------------|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|

120

120

Mori Seiki

Mori Seiki CNC Lathe Large

MORI SEIKI CNC LATHE LARGE

Memo

1-Turn second side as per Folio FA705

2-Blend transition lines only, **do not sand whole tube**:

*Use mill bastard file, brush file repeatedly with file card.

*Do not use sandpaper coarser than 320 grit.

FOLIO REV: BDWG REV: B

3- Remove plugs and sand

0.00

0.00

0.00

0.00

130

130

QC

Quality Control

QC1- Inspect dimensions to dimension sheet

Memo

mmil
*12/11/08**mmil*
12/11/08

86678

July-06-12 11:22:59 AM

N900040100

Setup Start *NS1*

Stop *NS2*

Cust Item ID:

Customer:

Run Start *NR1*

Stop *NR2*

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

**Insp.
Stamp**

DAS 12/11/12

9-89 ~~FK~~ 12/11/12

Memo

0.00

0.00

Memo

GRIND ONLY TRANSITION LINES SMOOTH LONGITUDE WAY.

0.00

0.00

Memo

1- PRESSURE WASH X-TUBE INSIDE AND OUT

2- ACID ETCH X-TUBE INSIDE AND OUT. USE RED SCOTCH BRITE

Work Order ID 86678

86678

Page 4

July-06-12 11:22:59 AM

Item ID: D212-664-107TRN Accept *N900040100* Setup Start *NS1*
 Revision ID: Stop *NS2*
 Item Name: Crosstube Turning Detail
 Start Date: 7/06/12 Start Qty: 1.00 *1* Cust Item ID:
 Required Date: 7/06/12 Req'd Qty: 1.00 *1* Customer:
 Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start *NR1*
 QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop *NR2*

| Sequence ID/ Work Center ID | Operation Description | Set Up/ Run Hours | Tool ID | Tool # | Plan Code | Accept Qty | Reject Qty | Reject Number | Insp. Stamp |
|--------------------------------|--|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|
| 160 | QC5- Inspect part completeness to step on W/O | 0.00 | | | | | | | |
| *160* | | | | | | | | | |
| QC | Memo | 0.00 | | | | | | | |
| Quality Control | | | | | | | | | |
| 170 | | 0.00 | | | | | | | |
| *170* | Packaging | | | | | | | | |
| Packaging | Memo | 0.00 | | | | | | | |
| Packaging | Identify and stock in kanban rack Location: <u>LG</u> | | | | | | | | |
| 180 | QC21- Final Inspection - Work Order Release | 0.00 | | | | | | | |
| *180* | | | | | | | | | |
| QC | Memo | 0.00 | | | | | | | |
| Quality Control | | | | | | | | | |



[Signature] 12-11-21

[Signature] 12-11-21

12/11/22 *[Signature]*

mf
12-11-21

Picklist Print

July-06-12 11:22:58 AM

Page 1

Work Order ID: 86678

Parent Item: D212-664-107TRN

Start Date: 7/06/12

Required Date: 7/06/12

Parent Item Name: Crosstube Turning Detail

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP Rev:A New Issue 08-03-06 DD Verified by:ec
IPP Rev B Removed polish 08.04.02 EC verified: DD

| Component Item ID/ Item Name | Replacement Item ID | Mfg/ Purch | Bin Item | Primary Location | Last Location | Route Seq ID | Unit of Measure | Qty on Hand | Qty per Kit | Total Qty | Qty Issued | Date Issued | Status |
|---------------------------------|------------------------|---------------|-------------|---------------------|------------------|-----------------|--------------------|----------------|-------------|--------------|---------------|----------------|--------|
| D6019-128 Crosstube Material | | Manufactured | No | | | 110 | Each | 48.0000 | 1 | 1 | | | |

Location

Loc Qty

Loc Code

LG

48

69803

17

75635

24

79741

7

1 man, L 12/11/06

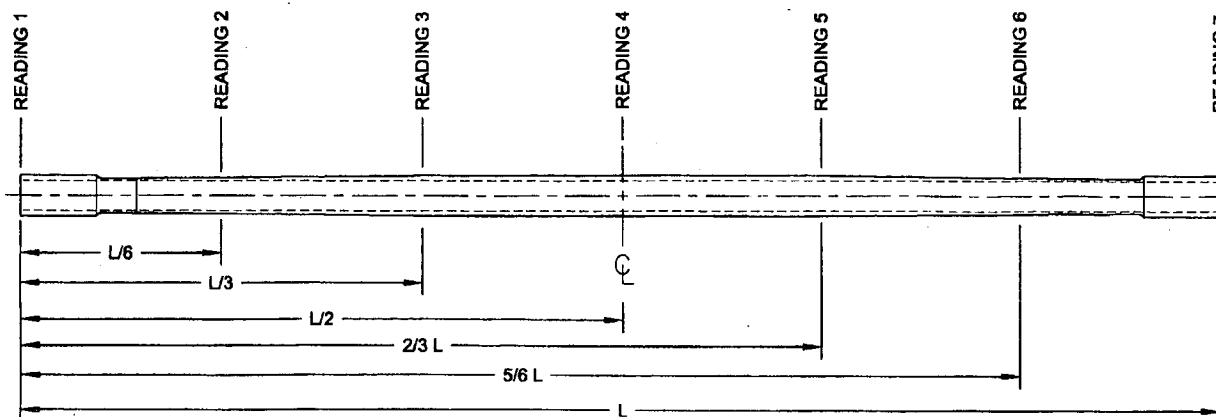
| | | |
|--|---------------------|--------------|
| DART AEROSPACE LTD | Work Order: | 86678 |
| Description: Crosstube Assembly (205/212/412 Low Fwd) | Part Number: | D212-664-147 |
| Inspection Dwg: D212-664-147 Rev: B | | Page 1 of 2 |

FIRST ARTICLE INSPECTION CHECKLIST

| Inspection Sheet Drawing Dimension | | Tolerance | Actual Dimension | Accept | Reject | Method of Inspection | Comments |
|---------------------------------------|-----------|---------------|---------------------|--------|--------|-------------------------|----------|
| SIDE A | 0.313 | +/-0.010 | .313 | ✓ | | vern | CWL-08 |
| | 2.360 | +0.005/-0.000 | 2.363 | ✓ | | ↓ | |
| | 2.360 | +0.005/-0.000 | 2.365 | ✓ | | | |
| | 2.366 | +0.005/-0.000 | 2.369 | ✓ | | | |
| | 2.473 | +0.005/-0.000 | 2.478 | ✓ | | | |
| | 2.573 | +0.005/-0.000 | 2.577 | ✓ | | | |
| | 2.673 | +0.005/-0.000 | 2.678 | ✓ | | | |
| | 2.750 | +0.005/-0.000 | 2.750 | ✓ | | | |
| | 2.750 | +0.005/-0.000 | 2.750 | ✓ | | | |
| | | | | | | | |
| SIDE B | 0.313 | +/-0.010 | .313 | ✓ | | vern | CWL-08 |
| | 2.360 | +0.005/-0.000 | 2.363 | ✓ | | ↓ | |
| | 2.360 | +0.005/-0.000 | 2.365 | ✓ | | | |
| | 2.366 | +0.005/-0.000 | 2.368 | ✓ | | | |
| | 2.473 | +0.005/-0.000 | 2.478 | ✓ | | | |
| | 2.573 | +0.005/-0.000 | 2.578 | ✓ | | | |
| | 2.673 | +0.005/-0.000 | 2.678 | ✓ | | | |
| | 2.750 | +0.005/-0.000 | 2.750 | ✓ | | | |
| | 2.750 | +0.005/-0.000 | 2.750 | ✓ | | | |
| | | | | | | | |
| | 0.126.528 | +/-0.020 | 126.530 | ✓ | | tape | LG-22 |

| | |
|--|----------------------------------|
| DART AEROSPACE LTD | Work Order: 86478 |
| Description: Crosstube Assembly (205/212/412 Low Fwd) | Part Number: D212-664-147 |
| Inspection Dwg: D212-664-147 Rev: B | Page 2 of 2 |

WALL THICKNESS MEASUREMENT



| Location | WALL THICKNESS MEASUREMENT (IN) | | | | Deviation Δw (max-min) | TOLERANCE |
|---------------------|---------------------------------|------|------|------|--------------------------------------|-----------|
| | w1 | w2 | w3 | w4 | | |
| READING 1 L= 0" | .127 | .139 | .138 | .127 | .012 | 0.048" |
| READING 2 L= 14 | .126 | .137 | .145 | .132 | .019 | |
| READING 3 L= 30 | .227 | .240 | .233 | .218 | .022 | |
| READING 4 L= 63 | .326 | .336 | .335 | .323 | .013 | |
| READING 5 L= 90 | .228 | .223 | .239 | .235 | .012 | |
| READING 6 L= 141 | .135 | .128 | .140 | .142 | .012 | |
| READING 7 L= 174 | .130 | .144 | .139 | .121 | .023 | |

Calibration Result

Actual Block Thickness: .100 .500

Site 250 Measured Thickness: .100 .500

| |
|---------------------------------|
| Measured by: <i>mm.c</i> |
| Date: 11/12/12 |

| |
|---|
| Audited by: <i>FS / 12/11/12</i> |
| Date: 12/11/12 |

| |
|--------------------------------|
| Prototype Approval: N/A |
| Date: N/A |

| Rev | Date | Change | Revised by | Approved |
|-----|----------|------------------------------|------------|----------|
| A | 08.11.07 | New Issue (P/O D212-664-107) | KJ/EC | |
| B | 10.02.02 | Dimension 126.528 was 126.53 | KJ | |
| C | 12.06.04 | Wall thickness form added | KJ | |

| B | | | | |
|------|-------------|--------------|-------------------|---|
| Item | Qty -147 | Qty -147B | Part Number | Description |
| 1 | X | | D212-664-147 | CROSSTUBE ASSEMBLY (205/212/412 LOW FWD) |
| 2 | | X | D212-664-147B | CROSSTUBE ASSEMBLY (214 LOW FWD) |
| 3 | 1 | 1 | D6019-128 | CROSSTUBE |
| 4 | 2 | 2 | D2893-1 | SUPPORT |
| 5 | 4 | 4 | D3595-063-450 | RUBBER CUSHION |
| 6 | 2 | 2 | D3659-1 | CUFF |
| 7 | 4 | 4 | MS21920-25 | CLAMP (OR MS21920-26) |
| 8 | 44 | 44 | CR3212-4-06 | RIVET (OR M7885/3-4-06) |
| 9 | A/R | A/R | MAGNOBOND 6398 | ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE) |
| 10 | A/R | A/R | SIKAFLEX-241/-291 | SEALANT (OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT) |

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6019-128
FINISHED LENGTH = 126.528±0.020 (BEFORE BENDING/TRIMMING)
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D212-664-XXX" AND BATCH NUMBER ON INSIDE OF CUFF
USING VIBRATING STYLUS.
- 7) WEIGHT: D212-664-147 = 24.2 lbs (PER IIN-D212-664)
D212-664-147B = 24.2 lbs (PER IIN-D212-664)
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) WHEN MACHINING TAPER, RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALLY. TRANSITION SHOULD BE SMOOTH.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D., EXCEPT UP TO 10% IS ALLOWED IN AREA NOTED.
- 11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 12) INSTALL D2893-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2893-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 13) INSTALL MS21920-25 CLAMPS (OR -26) WITH D3595-063-450 RUBBER CUSHIONS TO SECURE THE D2893-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE OF CROSSTUBE SUPPORT.
- 14) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.
- 16) INSTALL D3659-1 CUFF AFTER CHEMICAL CONVERSION COAT BUT BEFORE PAINT. WITH A LAYER OF SIKAFLEX-241/-291 OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT BETWEEN CUFF AND CROSSTUBE. SEAL EDGE OF CUFF TO ENSURE NO GAPS.
- 17) TOUCH-UP HOLES WITH CHEMICAL CONVERSION COAT.

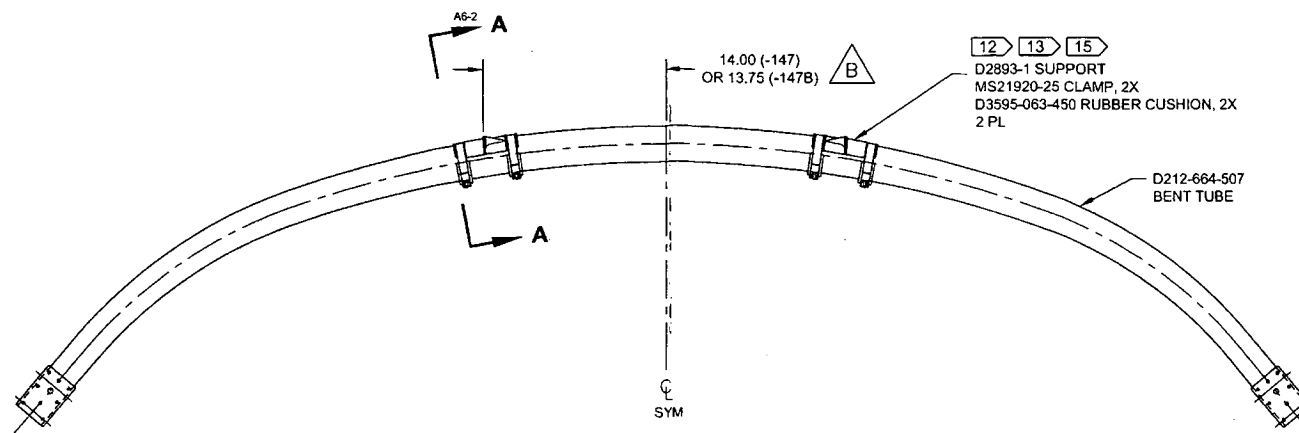
SHORT COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO REVISION
WITHOUT NOTICE
NO *Side 78*
PL 12074

DEO ATTACHED

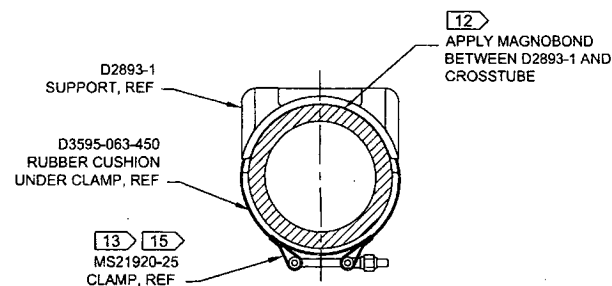
Per ECW#11-64
11-07-20
UNDER REVIEW
11/16/2013

RELEASED
2009-10-29
W

| | | | |
|------------|--|--|--------------|
| B | REVISE GENERAL NOTES/PART LIST; UPDATE TO CURRENT STANDARDS: ADD -147B (ZN C4-2, D4-2) | RF | 09.09.30 |
| A | NEW ISSUE | CP | 07.07.07 |
| REV. | DESCRIPTION | BY | DATE |
| DESIGN | <i>9</i> | DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA | |
| DRAWN | RF | | |
| CHECKED | <i>9</i> | DRAWING NO. | REV. B |
| MFG. APPR. | <i>13</i> | D212-664-147 | SHEET 1 OF 4 |
| APPROVED | <i>10</i> | TITLE | SCALE |
| DE APPR. | <i>11</i> | CROSSTUBE (205/212/412 LOW FWD) | NTS |
| DATE | 09.09.30 | COPYRIGHT © 2007 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD. | |



**D212-664-147/-147B
ASSEMBLY DETAIL**



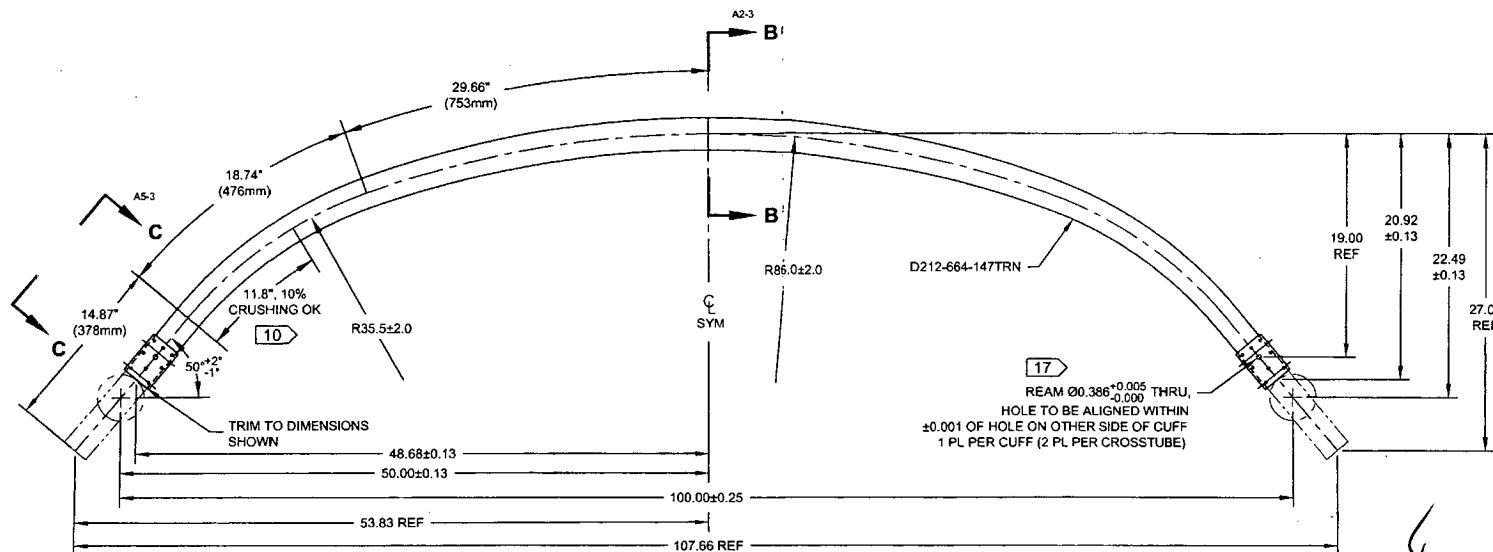
SECTION A-A D5-2
SCALE 4X

DEO ATTACHED

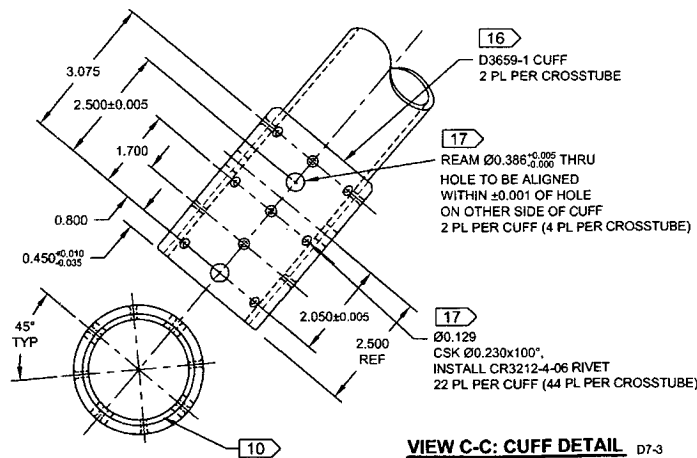
ECU #11-614
K.09.20
UNDER REVIEW
CP 11.06.13

RELEASED
2009-10-29

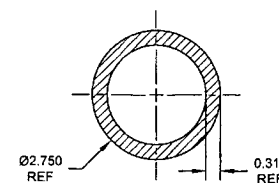
| | | | |
|------------|----------|--|--------------|
| DESIGN | 97 | DART AEROSPACE LTD | |
| DRAWN | RF | HAWKESBURY, ONTARIO, CANADA | |
| CHECKED | 97 | DRAWING NO. | REV. B |
| MFG. APPR. | 18 | D212-664-147 | SHEET 2 OF 4 |
| APPROVED | 18 | TITLE | SCALE |
| DE APPR. | 18 | CROSSTUBE (205/212/412 LOW FWD) | NTS |
| DATE | 09.09.30 | <small>COPYRIGHT © 2007 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.</small> | |



D212-664-507
BENDING AND DRILLING DETAIL 10 B



VIEW C-C: CUFF DETAIL D7-3
 SCALE 4X



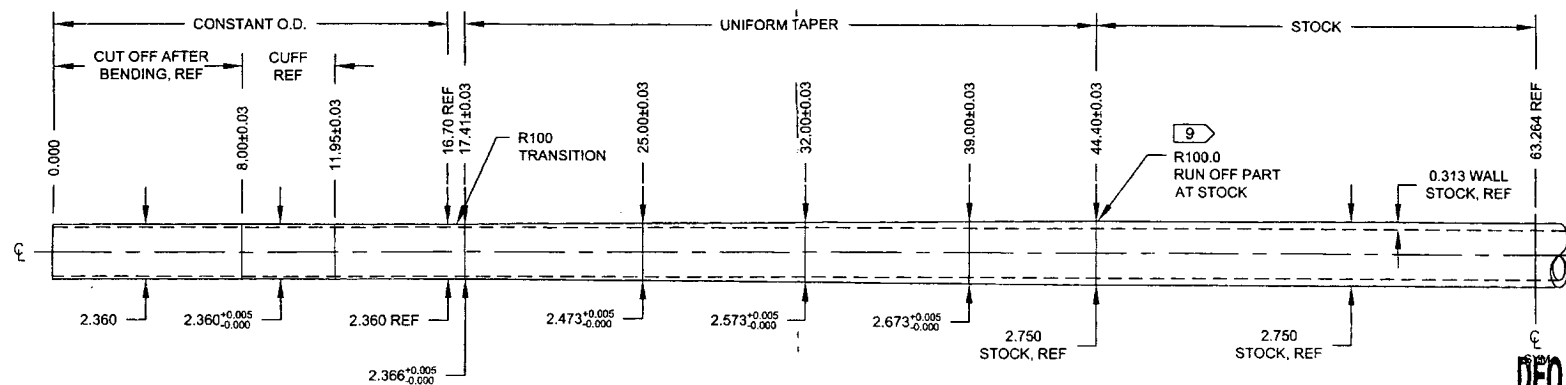
SECTION B-B D5-3
 SCALE 4X

DEO ATTACHED

60411-614
 09.09.20
 UNDER REVIEW
 09.10.13

RELEASED
 2009-10-29

| | | | |
|--|----------|--|--------------|
| DESIGN | 9 | DART AEROSPACE LTD | |
| DRAWN | RF | HAWKESBURY, ONTARIO, CANADA | |
| CHECKED | 9 | DRAWING NO. | REV. B |
| MFG. APPR. | 18 | D212-664-147 | SHEET 3 OF 4 |
| APPROVED | 19 | TITLE | SCALE |
| DE APPR. | 19 | CROSSTUBE (205/212/412 LOW FWD) | NTS |
| DATE | 09.09.30 | COPYRIGHT © 2007 BY DART AEROSPACE LTD | |
| THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD. | | | |



D212-664-147TRN
TURNING DETAIL

DEO ATTACHED

CCO #1-614
11.07.26
UNDER REVIEW
12/11/06/13

RELEASED
2009-10-29
ND

| | | | |
|---|----------|--|--------------|
| DESIGN | 9P | DART AEROSPACE LTD | |
| DRAWN | RF | HAWKESBURY, ONTARIO, CANADA | |
| CHECKED | 9P | DRAWING NO. | REV. B |
| MFG. APPR. | 18 | D212-664-147 | SHEET 4 OF 4 |
| APPROVED | 9P | TITLE | SCALE |
| DE APPR. | 18 | CROSSTUBE (205/212/412 LOW FWD) | NTS |
| DATE | 09.09.30 | COPYRIGHT © 2007 BY DART AEROSPACE LTD | |
| THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSES OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD. | | | |

| | | | | | | | |
|-----------------------------|--|--------------------------|---|--|--------------------------------|---------------------------|--------------|
| DRAWING NO. D212-664-147 | TITLE CROSSTUBE ASS'Y (205 LOW FWD) | REV. B | DART AEROSPACE LTD ENGINEERING ORDER | | D.E.O. NO. D212-664-147-B-1 | SHEET NO. SHEET 1 OF 1 | SCALE NTS |
| DRAWN <i>qp</i> | CHECKED <i>ASS</i> | MFG. APPR. <i>185</i> | APPROVED <i>MP</i> | | DE APPR. <i>MP</i> | | |
| DATE 11.07.15 | DATE 11.07.20 | DATE 11.07.21 | DATE 11/07/21 | | DATE 11.07.21 | | |

PURPOSE:

REPLACE MAGNOBOND WITH PROSEAL.

CHANGE:

IS:

| Item | Qty -147 | Qty -147B | Part Number | Description |
|------|-------------|--------------|-----------------|-------------------------------|
| 9 | A/R | A/R | PROSEAL 890 B-2 | SEALANT, AMS-S-8802 CLASS B-2 |

WAS:

| | | | | |
|---|-----|-----|----------------|---|
| 9 | A/R | A/R | MAGNOBOND 6398 | ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE) |
|---|-----|-----|----------------|---|

NOTE 12 & 15, SHEET 1 IS AMENDED AS FOLLOWS:

IS:

12) TO INSTALL D2893-1 SUPPORT: ABRASE MATING SURFACE OF SUPPORT AND CROSSTUBE WITH 180-GRIT SANDPAPER AND REMOVE RESIDUE WITH MEK (OR EQUIVALENT). APPLY A 0.04" TO 0.07" THICK LAYER OF PROSEAL 890 CLASS B-2 (OR AMS-S-8802 CLASS B-2) SEALANT TO MATING SURFACE OF SUPPORT.

15) TORQUE CLAMPS 80 TO 100 IN.-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. **PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER PROSEAL 890 SEALANT HAS CURED FOR 72 HOURS.**

WAS:

12) INSTALL D2893-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2893-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.

15) TORQUE CLAMPS 80 TO 100 IN.-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

Sheet 28

RELEASED
2011-07-28
W/B